WHAT IS CLAIMED IS:

1. A road monitoring method for a vehicle using a camera, comprising:

receiving a picture signal from said camera;

detecting a target from said picture signal;

calculating a horizontally estimated distance from said vehicle to said target;

calculating variables including a vertical angle of said target on a circumference and a curvature radius of said circumference; and

calculating an actual distance from said vehicle to said target based on said vertical angle and said curvature radius.

2. The road monitoring method of claim 1, wherein said calculating a horizontally estimated distance calculates said horizontally estimated distance as a value of L satisfying an equation $L = \alpha \cdot h \cdot \frac{f^2 + y \cdot c}{f \cdot (y - c)}$, where α, f, h, c, and y respectively denote a proportional coefficient, a focal distance of said camera, a height of a center of said camera from a road surface, a vertical picture-coordinate of a horizon of a flat road, and a vertical picture coordinate of said target.

3. The road monitoring method of claim 1, wherein said calculating variables comprises:

determining whether a road is curved upward or downward;

calculating said vertical angle of said target on said circumference; and

calculating a corresponding curvature radius among an upward

curvature radius and a downward curvature radius according to a determination of said determining whether said road is curved upward or downward.

4. The road monitoring method of claim 3, wherein, in said determining whether a road is curved upward or downward, a plurality of lane markers is detected from said picture signal and whether said road is curved upward or downward is determined based on a shape of said plurality of lane markers.

5. The road monitoring method of claim 3, wherein, in said determining whether a road is curved upward or downward, it is determined that said road is curved upward if a vertical picture-coordinate of a horizon in said picture signal is higher than a predetermined vertical picture-coordinate, and it is determined that said road is curved downward if a vertical picture-coordinate of a horizon in said picture signal is lower than said predetermined vertical picture-coordinate.

6. The road monitoring method of claim 3, wherein, in said calculating said vertical angle of said target, said vertical angle of said target is calculated as a value of ϕ satisfying an equation $c' = f \times \tan(\phi + \theta)$, where c', f, and θ respectively denote a vertical picture-coordinate of a horizon in said picture signal, a focal distance of said camera, a value satisfying an equation $c = f \times \tan(\theta)$ where c is a vertical picture-coordinate of a horizon of a flat road.

7. The road monitoring method of claim 3, wherein, in said calculating a corresponding curvature radius, said upward curvature radius is calculated as

a value of R satisfying an equation $L=\frac{h\cdot R\cdot\sin\phi}{h-R\cdot(1-\cos\phi)}$, where L, h, and ϕ respectively denote said horizontally estimated distance, a height of a center of said camera from a road surface, and said vertical angle of said target.

8. The road monitoring method of claim 7, wherein said value of R satisfying an equation $L=\frac{h\cdot R\cdot\sin\phi}{h-R\cdot(1-\cos\phi)}$ is calculated based on a predetermined map having variables of said L and said ϕ.

9. The road monitoring method of claim 3, wherein, in said calculating a corresponding curvature radius, said downward curvature radius is calculated as a value of R satisfying an equation $L=\frac{h\cdot R\cdot\sin\phi}{h+R\cdot(1-\cos\phi)}$, where L, h, and ϕ respectively denote said horizontally estimated distance, a height of a center of said camera from a road surface, and said vertical angle of said target.

10. The road monitoring method of claim 9, wherein said value of R satisfying an equation $L=\frac{h\cdot R\cdot\sin\phi}{h+R\cdot(1-\cos\phi)}$ is calculated based on a predetermined map having variables of said L and said ϕ.

11. The road monitoring method of claim 1, wherein, in said calculating an actual distance, said actual distance is calculated as an absolute value of l, said l satisfying an equation $l=R\phi$, where R and ϕ respectively denote a curvature radius of said circumference.

12. A road monitoring system for a vehicle comprising a camera for generating a picture signal and an electronic control unit for receiving said picture signal and monitoring a road based on said received picture signal,

wherein said electronic control unit performs:

detecting a target from said picture signal;

calculating a horizontally estimated distance from said vehicle to said target;

calculating variables including a vertical angle of said target on a circumference and a curvature radius of said circumference; and

calculating an actual distance from said vehicle to said target based on said vertical angle and said curvature radius.

13. The road monitoring system of claim 12, wherein said calculating a horizontally estimated distance calculates said horizontally estimated distance as a value of L satisfying an equation $L = \alpha \cdot h \cdot \frac{f^2 + y \cdot c}{f \cdot (y - c)}$, where α, f, h, c, and y respectively denote a proportional coefficient, a focal distance of said camera, a height of a center of said camera from a road surface, a vertical picture-coordinate of a horizon of a flat road, and a vertical picture coordinate of said target.

14. The road monitoring system of claim 12, wherein said calculating variables comprises:

determining whether a road is curved upward or downward;

calculating said vertical angle of said target on said circumference; and

calculating a corresponding curvature radius among an upward curvature radius and a downward curvature radius according to a determination of said determining whether said road is curved upward or downward.

15. The road monitoring system of claim 12, wherein, in said

calculating an actual distance, said actual distance is calculated as an absolute value of l, said l satisfying an equation $l = R\phi$, where R and ϕ respectively denote a curvature radius of said circumference.